

# WET EFFECTS

Aquatic Resources Education Newsletter



District of Columbia  
Department of Health



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## The Anacostia River

**HI STORY:** Native Americans, the Nacotchtank Indians, occupied the banks of the Anacostia River for more than 3,000 years. They were a sedentary, semi-agricultural people. Within a short sixty years after the arrival of Captain John Smith and the colonization of Jamestown in 1608, these Native Americans disappeared. Alterations to the river began in the 17<sup>th</sup> century. In 1791, the Anacostia was a mile wide and twenty feet deep. However, sedimentation due to increased development in the late 18<sup>th</sup> and 19<sup>th</sup> centuries caused tidal marshes to develop. Today, the river is much narrower due to channelization and a lot shallower due to sedimentation.

**GEOLOGY:** The Anacostia has a drainage area of 170 square miles and is part of the Potomac basin. It is composed of two physiographic provinces, the Piedmont Plateau and the Coastal Plain. The Piedmont Plateau composes 30% of the landscape. It is characterized by undulating low knobs and ridges with steep stream valleys. It also exhibits metamorphic rock types (rocky, nonabsorbent clay soils), gently rolling deep soils and well-drained loams. The Coastal Plain comprises the remaining 70% of the landscape. Its sedimentary deposits are loosely mixed with gravel, sand and clay. These clays are unstable and pose potential landslide hazards. These soils shrink when dry and expand when wet. They are also subject to wind erosion.

**HYDROLOGY:** The basin receives about 40 inches of precipitation annually. The precipitation is evenly distributed throughout the seasons of the year. Therefore, high river flows can occur during any month. Water slows

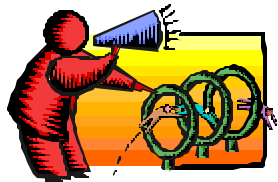
as it leaves the Piedmont Plateau and enters the Coastal Plain. Here the Anacostia looks like a river, but acts like a lake or sink (water movement is sluggish). Because the Anacostia's flush time is tide dependent, water may reside in the river for extended periods of time before reaching the Potomac. The average flush time for the Anacostia is 20 days, but a 40-day flush time is not uncommon during the fall season.



*The Anacostia in the early 1900s.*

**FISH AND HABITAT:** Historically, the Anacostia was a valuable spawning ground and nursery area for anadromous fish. Today the fishery remains below its potential because of poor water quality. Generally, most of the river's problems come from excess sediment and bacteria as well as low

dissolved oxygen (DO). Aquatic life requires a minimum of 5 mg [DO] per liter of water. The river's [DO] regularly falls below the standard and at times its [DO] approaches zero. From 1948-1949, records of fish species show that there were 31 different fish species in the upper tributaries of the Anacostia. By 1972, surveys found only 25 different fish species in the same tributaries. District of Columbia fisheries biologists between 1990 and 1999 have recorded a total of 52 different fish species (main stem). Today, biologists routinely document on average about 34 different fish species common in the main stem of the river within the boundaries of the District.



## NEWS

**HELP WANTED:** The D.C. Fisheries and Wildlife Division is seeking responsible, mature and dependable individuals to work in our summer aquatic resources education program. Individuals should have a background in environmental and/or biological sciences with a desire to learn and work with youth and young adults. College bound and college freshmen are encouraged to apply. Contact Sylvia Whitworth at (202) 535-2260. The program will operate June 11, 2001 and run through August 3, 2001.

## Knowledge is Power: **WORD POWER**

### Vocabulary List

Biology	Ethology	Ornithology
Bryology	Geology	Paleontology
Chronology	Herpetology	Palynology
Cytology	Histology	Pathology
Ecology	Ichthyology	Pteridology
Embryology	Mammalogy	Physiology
Entomology	Morphology	Zoology

**Directions:** Place the number of the definition below beside the correct word in the above vocabulary list.

(Hint: "-logy" is from Latin "-logia," meaning the science, theory or study of )

The study of . . .

- birds
- animals
- tissue structure
- fishes
- ferns
- function of living things
- mammals
- insects
- plants and animals in their natural environment
- animal behavior
- dates and the sequence of events in time
- modern and fossil pollen
- diseases
- life and living things
- mosses and liverworts
- cell structure
- amphibians and reptiles
- form
- development
- ancient fossils and ancient forms of life
- origin, history and the structure of the earth

For Answers: See page 5.

# Creature Feature

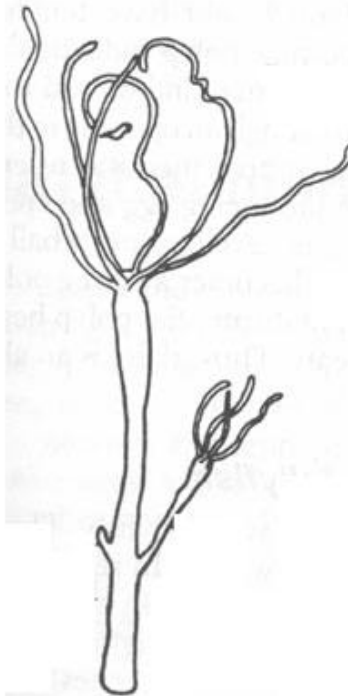
## Hydra

*Phylum: Cnidaria, Class: Hydra*

Hydra are any of various small freshwater polyps having a naked, cylindrical body and an oral opening surrounded by tentacles. They are the most primitive of the *Cnidaria*. They are about 12 millimeters long and have eight tentacles that surround the mouth-anus. The hydra is a microscopic creature that is frequently found attached to things by a stem. Its tentacles contain stinging cells that paralyze tiny creatures that swim against its tentacles. Even a small fish which is much larger than a hydra can be captured and swallowed. Some hydras are males and others may be female. However, hydras mainly reproduce by budding. Budding is asexual reproduction. Buds are formed on the walls of their tube-like bodies during the warm months of the year. Each bud will grow, form tentacles and pinch off to lead its own life. Sexual reproduction occurs when male and female hydras discharge sperm and egg into the water. Fertilization takes place and new hydras develop.

Locomotion is made possible by epitheliomuscular cells that contain myonemes (contractile fibers). To move, hydras somersault end over end. Hydras have a simple nervous system which consists of slim, pointed sensory cells scattered throughout the endoderm and ectoderm layers. The cells form a nerve net which enables the animal to respond to chemical and tactile stimuli in the environment. The nerve net is a very primitive nervous system which produces a reflex arc. The neurons are all similar and linked in a web or net throughout the body. Signals move through the nerve net very slowly, but a stimulus can spread throughout the entire nerve net and reach the body muscle to cause it to contract. This motion (contraction) is called a reflex because it is an automatic response of the nerve stimulation. Humans have a similar simple nervous system response; the "knee jerk" response,

but humans have a complex nervous system. Our sensory responses involve a relay of information through associative afferent (towards) and efferent (away from) interneurons and tracts to the brain.



Expanded



**Factoid:** When the amount of carbon dioxide (CO<sub>2</sub>) dissolved in water is higher than normal, hydras will develop either male or female reproductive organs instead of buds.

# A Simple Experiment

Objective: To demonstrate how thunder is produced

Materials: A paper lunch bag

Procedure:

- ? ? Fill the paper bag with air by blowing into it.
- ? ? Twist the open end of the bag and hold it closed with your hand.
- ? ? Quickly and with force hit the bag with your free hand.



Results: The bag breaks and a loud noise is heard.



**Why?** Hitting the bag causes the air inside to compress very quickly. This pressure makes the air inside the bag to push out and break the bag. The air rushes out of the bag in a wave motion. A sound is heard when the waves of air reaches your ear. Thunder is also the result of moving air. As lightning strikes, it gives off energy. This energy heats the surrounding air and causes it to expand. The expanded air also travels in waves and when the waves reach your ear you hear THUNDER!

## DO THE MATH:

### ADAPTATION (Grades 7 and up)

Adaptation is a change in the structure, physiology or behavior of an organism that increases its ability to survive and reproduce in its environment. Yes, there are advantages for birds with short or long beaks; fish with dull or brilliant colors; mammals with short or long legs, etc.

**For Example:** Animals make what sometimes seem to be incredible journeys to seek water. The desert bighorn sheep is one such animal. It lives in dry, sparsely vegetated areas of southwestern North America. Temperatures on summer days are often over 100°F. During the hottest months of summer, ewes (females) and (young) lambs visit waterholes daily. However, the (rams) males sometimes do not come to get water for nearly a week at a time. Rams often travels 65 miles between each visit to their waterholes. On average they travel 5 miles per day during the week and will travel up to 20 miles a day to get water. Rams are believed to drink about four (4) gallons of water when they do come to drink, while ewes drink about one (1) gallon and lambs about two (2) pints.

### Do the Math:

1. How many miles to the gallon does a ram get?
2. How much water would a ram need per month?
3. How much water would an ewe drink in a week?
4. How much water would a lamb drink in a week?
5. How much water must be available in a waterhole for ten (10) rams, sixteen (16) ewes, and seven (7) lambs in order for them to survive the months of June, July and August?

Word Power Answers: Biology (14), Bryology (15), Chronology (11), Cytology (16), Ecology (9), Embryology (19), Entomology (8), Ethology (10), Geology (21), Herpetology (17), Histology (3), Ichthyology (4), Mammalogy (7), Morphology (18), Ornithology (1), Paleontology (20), Palynology (12), Pathology (13), Pteridology (5), Physiology (6), Zoology (2)

#### Do The Math Answers:

- 1)  $65/4 = 16.25$  miles/gallon
- 2) 52 weeks (in a year) divided by 12 months = 4.33 wks/month.  $4.33 \times 4 \text{ gal/wk} = 17.3$
- 3) 7 days  $\times 1 \text{ gal/day} = 7 \text{ gal/week}$
- 4) 2 pints/day  $\times 7 \text{ days} = 14 \text{ pints}$ . 14 pints divided by 8 pints/gal = 1.75 gal/wk
- 5) 92 days total. Assume no evaporation or rainfall (not realistic). Rams: 7 days ? 4 gallons = avg. 1.75 gal/day.  $1.75 \text{ gal/day} \times 92 \text{ days} \times 10 \text{ rams} = 1610$  gallons for rams. Ewes: 1 gal/day  $\times 92 \times 16 \text{ ewes} = 1472$  gallons for ewes. Lambs: 2 pints ? 8 pints/gal. = 0.25 gal/day  $\times 92 \times 7 \text{ lambs} = 161$  gallons for lambs. Total gallons is  $1610 + 1472 + 161 = 3243$  gallons